

Heatwatch

Mount Count Design

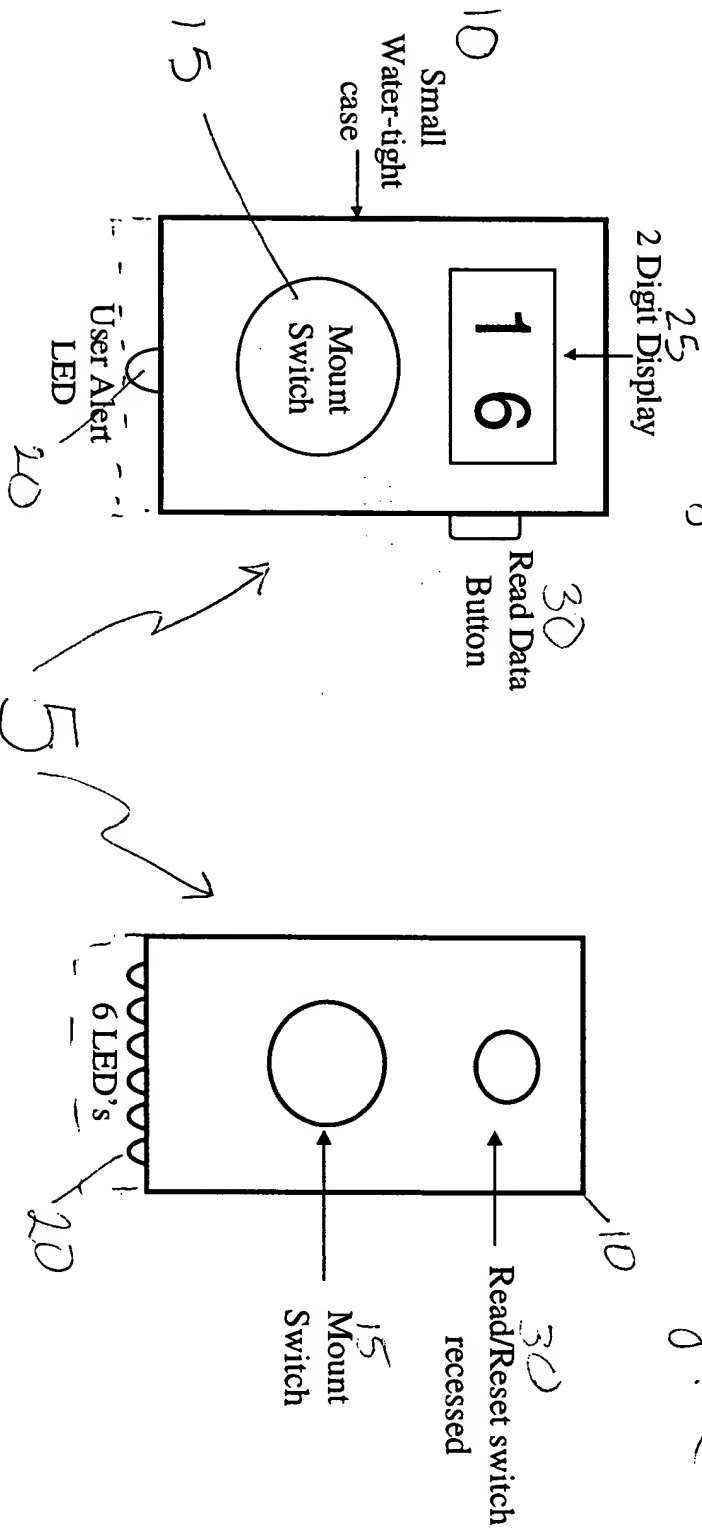
- Two versions are currently being considered
 - 2-digit display version
 - Estimated Parts Costs (1000's):

\$9

Fig. 1

\$7

Fig. 2



Confidential

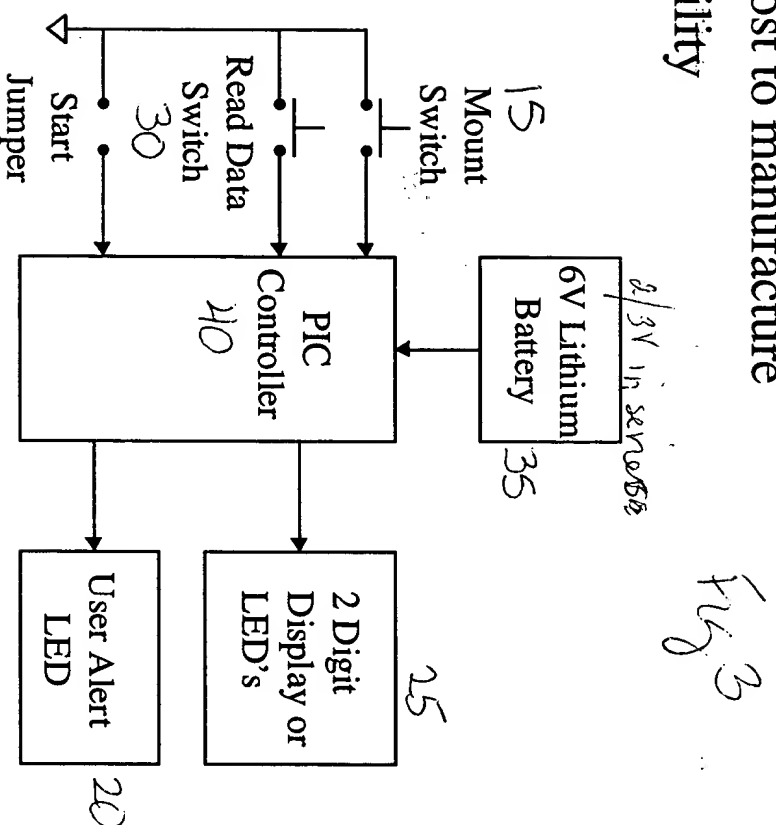
004470445 1232200

DDx, Inc.

Heatwatch

Mount Count Block Diagram

- Simple, low parts count design provides:
 - Low cost to manufacture
 - Reliability



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09470415 4222299

DDx, Inc.

Patent Considerations:

The patent issued in January, 1987 (Patent Number 4,635,587) is titled "Method and apparatus for detecting standing heat in cattle." The pertinent claim in this patent is as follows, with the critical parts **bolded**.

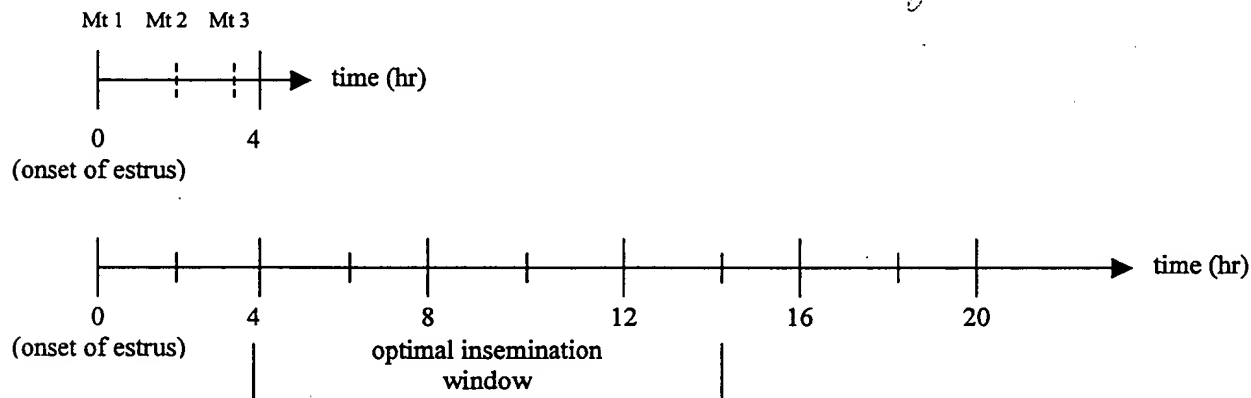
"A self-contained apparatus for detecting the onset of estrus in cattle, including:

a pressure responsive switch disposed to be **actuated by mounting of the cow**, timer means connected directly to said switch means **for activation thereby in count up fashion**, digital readout means connected to said timer means and disposed to **display the elapsed time after mounting of the cow**, audible and visible **signaling means** connected directly to said timer means to **emit a warning signal in response to activation of said timer means**, means for **securing said pressure responsive switch**, said time means, said readout means, and said signaling means together in closely adjacent fashion **to the base of the tail of a cow**; said means for securing including means for **displaying said elapsed time directly from the apparatus secured to the cow**, and said means for securing further including means for **emitting said audible and visible warning signals directly from the apparatus secured to the cow.**"

My interpretation of this patent leaves several areas in which the proposed design is not covered.

1. The proposed timing is from **determination** of estrus, not the **onset** of estrus. For example, the patent does not teach about algorithms to determine the actual estrus event, but simply teaches that the first mount indicates the initiation of mounting and starts the timer. With Dr. Nebel's research results in insemination timing, the optimal breeding window is 4-14 hours after onset of estrus. With an algorithm of 3 mounts in 4 hours to determine estrus, this optimal window will not be jeopardized (see Figure 3).

Figure 3. Estrus determination algorithm and optimal insemination timing. *Fig 4*

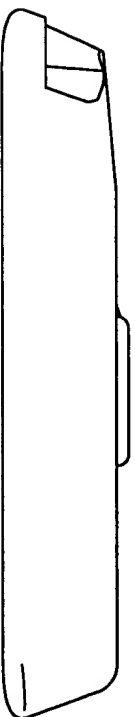
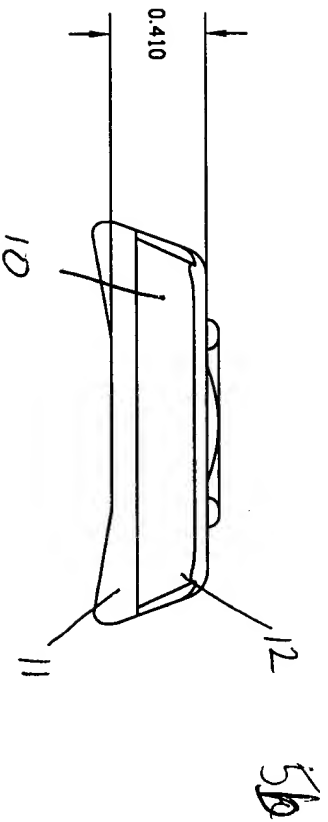
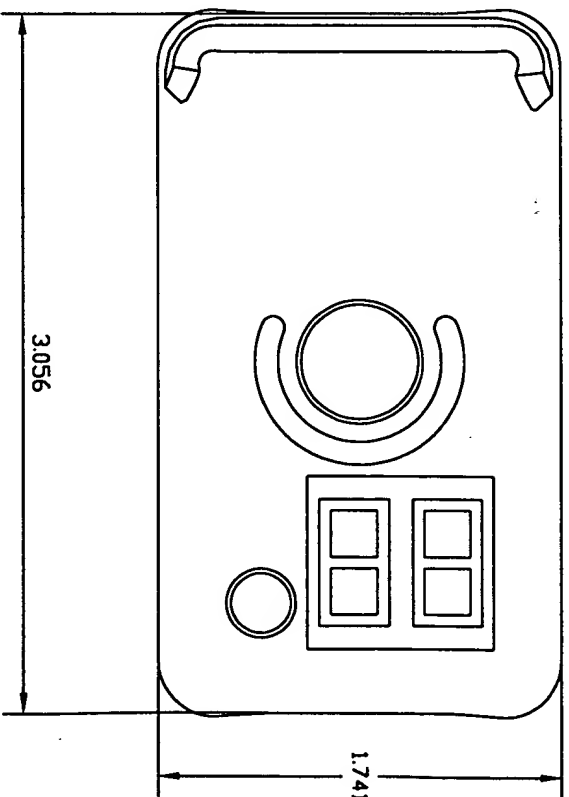
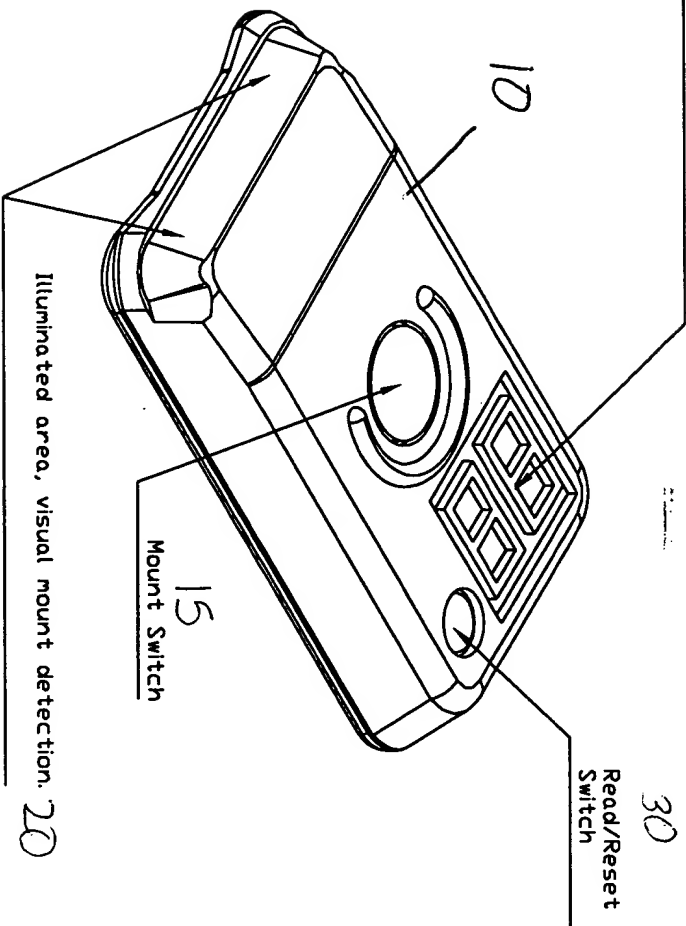


In one extreme case, the 3rd mount in 4 hrs would occur exactly on the 4th hour, i.e., 4 hours following onset. Therefore, the mount counter would indicate the determination of estrus 4 hours after the actual onset. The optimal insemination window would simply change from 4-14 hours following **onset** to 8-18 hours following **determination**. In the other extreme, the 3rd mount in 4 hrs would occur almost immediately after the 1st and 2nd mounts, making the **determination** of estrus almost coincide with the **onset**. Therefore, the optimal insemination window would remain at 4-14 hours following determination. Using the union of these extremes, the optimal window for insemination using "determination" would be 8-14 hrs.

2. The proposed algorithm for determining estrus would be x mounts in y hours, thus providing a means for elimination of false, non-estrus related mounts.
3. The proposed design would not only display the time from the determination of estrus, but also the accumulated number of mounts.

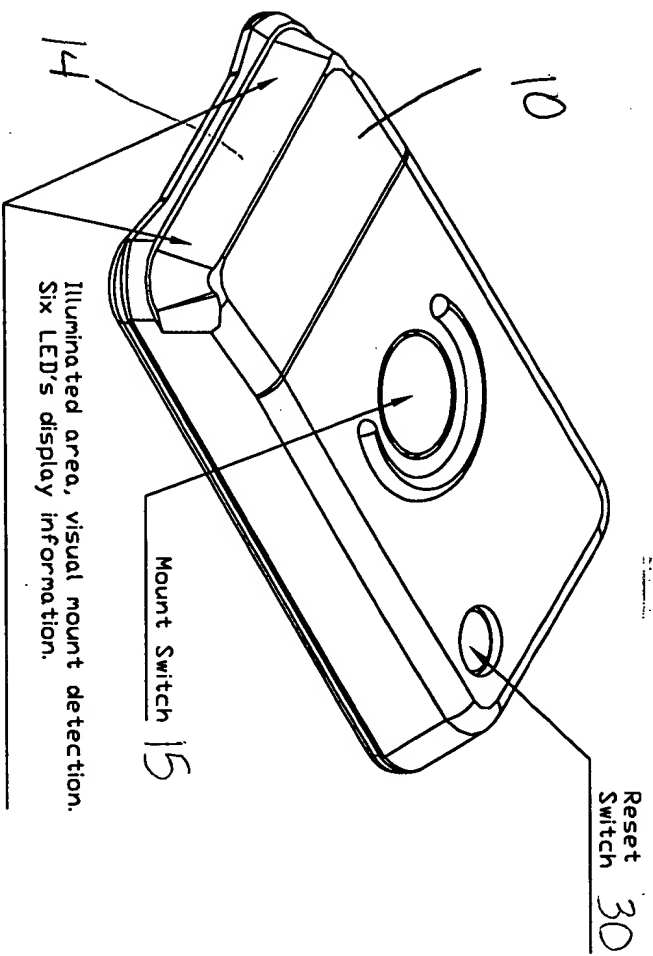
Fig. 1a

25
Display; Number of mounts.
Time since estrus detection(Hrs)
Number of uses left.

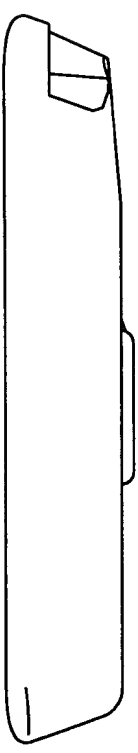
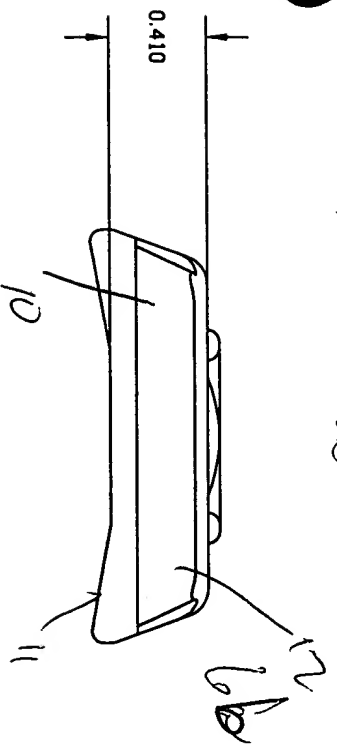
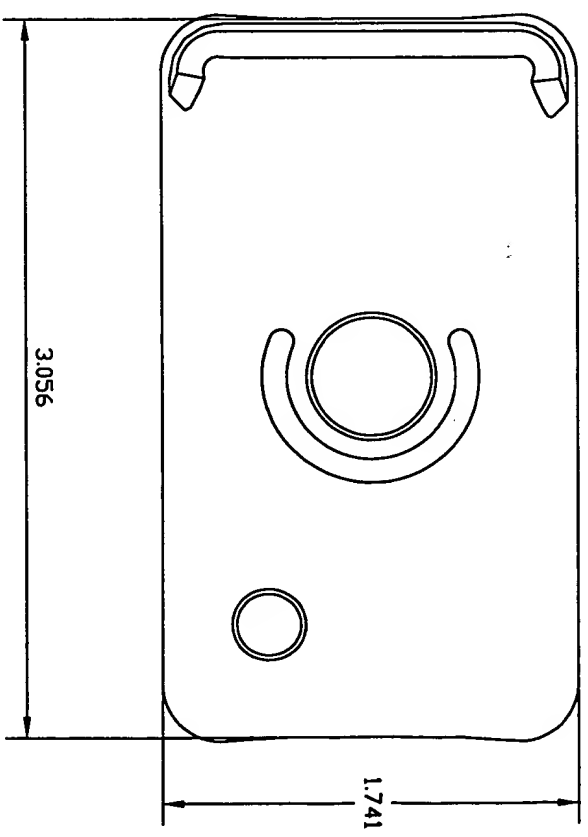


Mount Count with Display

Fig 1a



Illuminated area, visual mount detection.
Six LED's display information.



Mount Count w/o Display
Six Information LEDs

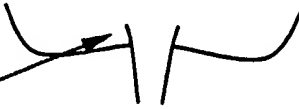
Sketch of Top View

Pin Bones

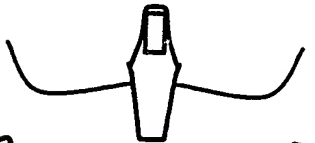


ons

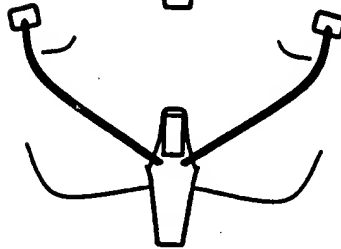
Tail Head



b



c



d

idea
ons
system

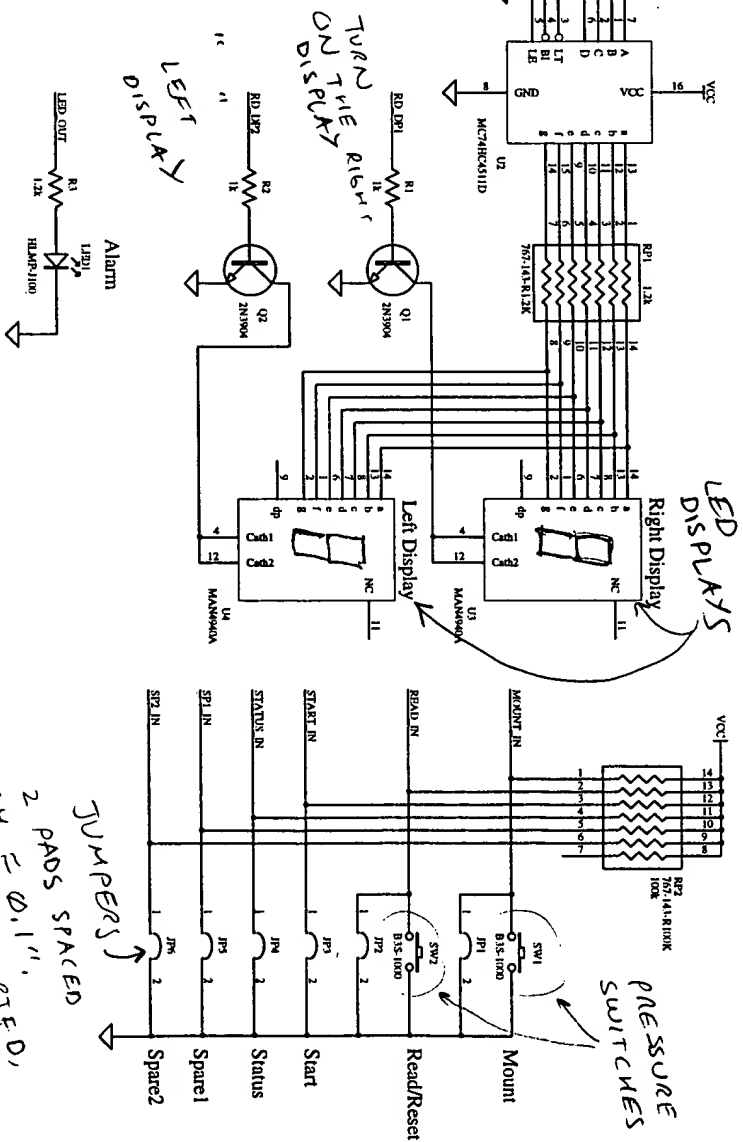
662222 97602466

4000

PRINTED CIRCUIT BOARD

Mount Count 1 Schematic Diagram Rev -

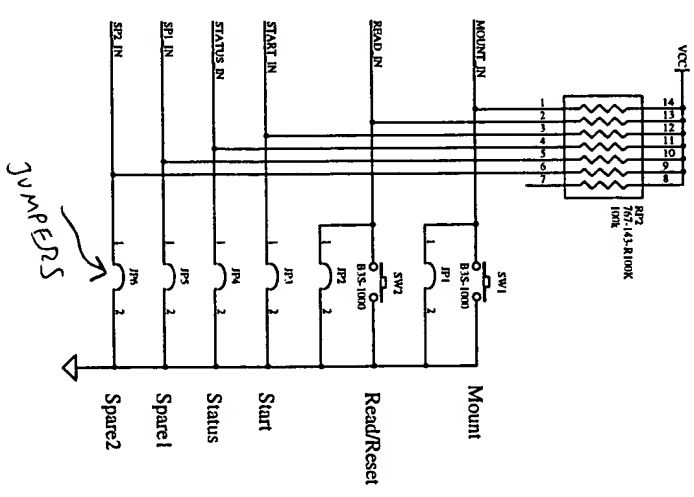
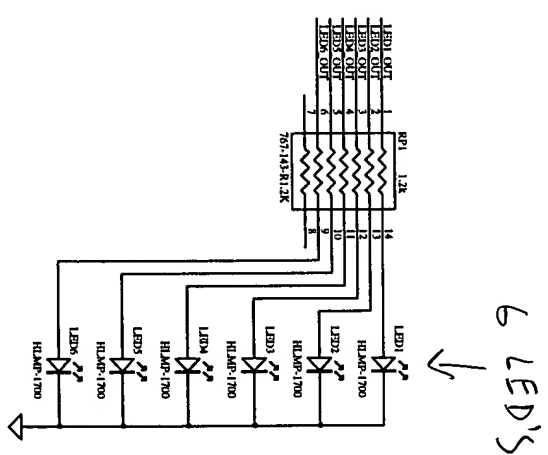
3V TOTAL
3V
3V
IN SERIES



DDx Inc.			
7000 North Broadway, Bldg. 3			
Suite 305			
Denver, CO 80221			
Title: Buffer Box II Schematic Diagram			
Proj. Number:	HW98-0015	Design By:	Tom Eichen
File:	C:\MYDOCU\DDX\HEATWA-IBUFFER\BBOX1.SCH		
Size:	B	Date:	15-Dec-1998
		Sheet:	1 of 1
		Rev:	

2 PADS SPACED BY 0.1" WHEN CAUSES THE IT CONTROL TO DO SOMETHING

Mount Count 2 Schematic Diagram Rev - For the PCB



DDx Inc. 7000 North Broadway, Bldg. 3 Suite 305 Denver, CO 80221				
Title: Buffer Box II Schematic Diagram				
Dwg. Number: HW98-0015		Design By: Tom Eiken		
File: C:\MYDOC\1-DDX\MEATVA-1\MEATVA-1B\FFRMT\COMUNT2.SCH				
Status: B	Date: 15-Dec-1998	Sheet 1	of 1	Rev:

MountCount™ Description and Operating Instructions

Copyright 1999, DDx, Inc

Author: Tom Ebben

Date: 7-28-99

The MountCount™ Unit by DDx, Inc.

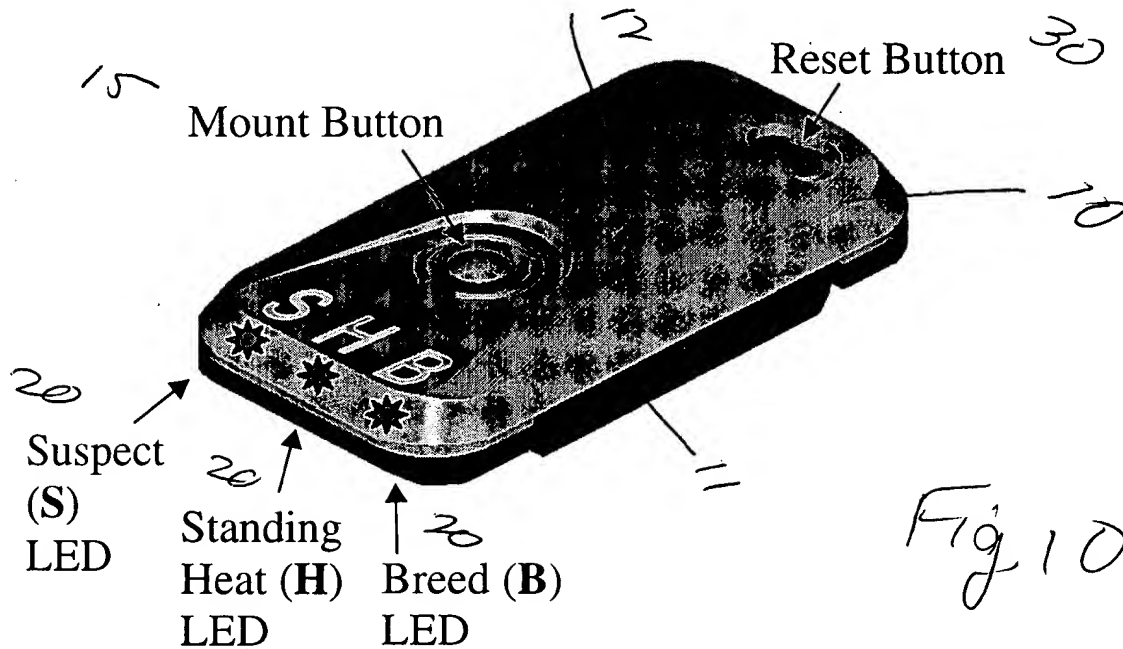


Figure 1. MountCount™ Unit top view

The MountCount™ Unit (MCU) shown in Figure 1 is an electronic device for the purpose of detecting estrus in the bovine species. It provides the user with visual indicators of when the animal is in heat, which substantially improves the chances of successfully breeding the animal. Standing heat in cattle has proven to be one of the most reliable means of determining the onset of the estrus cycle, which accurately predicts when ovulation occurs. Standing heat is defined by standing mounting activity where one animal mounts the tailhead of the animal in heat. The mounting activity is characterized by a substantial and consistent amount of pressure placed on the tailhead for short periods (seconds) of time. The MCU consists of a battery-powered electronic circuit board housed in a watertight case, which is attached to the tailhead of the animal in heat. The mounting activity is detected by a button, which is carefully designed to activate an electronic switch located on the circuit board. A sophisticated microprocessor senses the switch closure every time there is a mount, and performs mathematical computations to determine the state of the estrus cycle. The microprocessor then alerts the user of the estrus state by flashing high-intensity light emitting diodes (LED's) visible through the end of the case. In short, the MCU was designed to make the job of the breeder very easy – they simply need to observe when the Breed LED is flashing to know when to breed the animal.

